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The Intellect Naturalized: Roger Bacon on the Existence of Corporeal Species within the Intellect

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Abstract
In this paper I challenge the claim that Bacon considered the operation of *species* as limited to the physical and sensory levels and demonstrate that in his view, the very same *species* issued by physical objects operate within the intellect as well. I argue that in Bacon the concept of illumination plays a secondary role in the acquisition of knowledge, and that he regarded innate knowledge as dispositional and confused. What was left as the main channel through which knowledge is gained were *species* received through the senses. I argue that according to Bacon these *species*, representing their agents in essence, definition and operation, arrive in the intellect without undergoing a complete abstraction from matter and while still retaining the character of agents acting naturally. In this way Bacon sets the intellect as separate from the natural world not in any essential way, but rather as it were in degree, thus supplying a theoretical justification for the ability to access and know nature.

Keywords
Roger Bacon, species, intellect, abstraction, illumination

The works that Bacon sent to Clement IV in 1267, with the ambitious goal of proposing a thorough revision of Christian learning, present the reader with a seemingly contradictory picture.[1] On the

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[1] These works were the *Opus majus*, *Opus minus* and *Opus tertium*; the *De multiplicatione specierum* (henceforth DMS); and possibly some works on astrology and alchemy—perhaps even the *De speculis comburentibus*. See Alistair C. Crombie and John North, "Bacon, Roger," in *Dictionary of Scientific Biography*, vol. I (New York,

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one hand, they comprise a detailed and well-elaborated account of sense perception; yet on the other hand, they display a profound belief in the crucial role of divine illumination in human knowledge.

In trying to make sense of Bacon's understanding of how the human mind attains knowledge of the natural world, some modern interpreters have chosen to lay stress on the so-called "mystical" aspects of Bacon's thought. French and Cunningham, for instance, call attention to Bacon's "illuminationist" understanding of how knowledge and wisdom are acquired. They stress the primacy of the "mystical intellectual grasp of things" in his writings[2] and, out of loyalty to their thesis that Bacon's thought is to be understood first and foremost as the philosophy of a Franciscan friar, dub Bacon a "Dionysian."[3] According to their description, "Bacon takes the Aristotelian account of how perception and understanding work and transforms it, without comment, into an essentially Neo-Platonist one."[4] Maurer, too, is convinced that Bacon thought science was acquired through an inner illumination, by which God revealed the principles of philosophy, and which would afterwards be completed by experience.[5] Maurer interprets Bacon's return to Oxford after his Parisian period, during which he lectured on Aristotle, as a turn away from scholasticism towards Augustine and his ideal of wisdom.[6] In discussing Bacon's earlier works, Crowley notes the secondary role played by illumination and stresses that Bacon there adheres to the teachings of Aristotle and never consciously departs

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1970), 377-385, 378; David C. Lindberg, *Roger Bacon's Philosophy of Nature: A Critical Edition, with English Translation, Introduction and Notes, of* De multiplicatione specierum *and* De speculis comburentibus (Oxford, 1983), xxv; Jeremiah M.G. Hackett, "Roger Bacon: His Life, Career and Works," in *Roger Bacon and the Sciences: Commemorative Essay*, ed. Jeremiah M.G. Hackett (Leiden, 1997), 9-24, 22.

2) Roger French and Andrew Cunningham, *Before Science: The Invention of the Friars' Natural Philosophy* (Brookfield, Vermont, 1996), 243.

3) Ibid., 239. Such a label runs counter to the rarity of references to Dionysius in Bacon's writings.

4) Ibid., 239.

5) Armand A. Maurer, *Medieval Philosophy* (New York, 1962), 129-130.

6) Ibid., 127.

from them; but even he agrees that in his mature writings Bacon takes a noticeable turn towards illumination, a turn which Crowley attributes to the influence of Avicenna.[7] Rega Wood takes a similar stance, arguing that in his work after 1250 Bacon departs from the view that all science comes from sense and memory and appeals instead to internal spiritual experiences as producing scientific knowledge.[8] Hackett too stresses the prominence of divine illumination in Bacon. In seeking to account for the lack of a theory of abstraction in Bacon's mature writings, he claims that such a theory becomes futile given his "strong doctrine of illumination in which the *dator formarum* illumines the mind of the individual when the appropriate physio-psychological state has been engendered."[9]

In his pivotal work on intelligible *species*, Leen Spruit joins the crowd. In arguing against the notion of intelligible *species* in Bacon, he effectively sets up a barrier between sensory information and intelligible content in Bacon's epistemology. The process of the multiplication of *species*, Spruit declares, exerts no influence upon conceptualization.[10] When he refers to *species* as present in the rational soul and as originating from the cogitative faculty, Bacon merely qualifies them as instruments of soul, without presupposing any abstraction or impression from them.[11] Spruit claims further that it would be a logical fallacy on Bacon's part to accept that the corporeal *species* can be received into the strictly spiritual soul; and even if presumably abstracted, they would still be incompatible with

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7) Theodore Crowley, *Roger Bacon: The Problem of the Soul in his Philosophical Commentaries* (Louvain/Dublin, 1950), 178-179. Crowley qualifies that Bacon did not follow Avicenna in making the active intellect a giver of forms.

8) Rega Wood, "Imagination and Experience in the Sensory Soul and Beyond: Richard Rufus, Roger Bacon and their Contemporaries," in *Forming the Mind—Essays on the Internal Senses and the Mind/Body Problem from Avicenna to the Medical Enlightment*, ed. Henrik Lagerlund (Dordrecht, 2006), 28-57, 56.

9) Jeremiah Hackett, "Roger Bacon," in *A Companion to Philosophy in the Middle Ages*, eds. Jorge J.E. Gracia and Timothy B. Noone (Malden, MA, 2003), 616-625, 623.

10) Leen Spruit, *Species Intelligibilis from Perception to Knowledge,* vol 1. *Classical Roots and Medieval Discussions* (Leiden, 1994), 154.

11) Ibid., 154.

the central role that Bacon assigns to innate ideas and divine illumination.[12]

Spruit here is in fact arguing against Katherine Tachau, who asserted that Bacon "evidently believed that the process of multiplication continued through the intellectual powers as well."[13] Like Tachau, Mark Smith, writing in general about the Perspectivists' psychology of perception, sees no problem in accepting the existence of intelligible *species* in Bacon.[14] My argument in this paper could serve to substantiate the position presented by Tachau and Smith, although it differs from theirs in some significant aspects, most notably, in taking issue with their views on abstraction in Bacon.[15]

The problem of the reception of *species* into the intellect in Bacon's thought appears to stand at the heart of the issue. If indeed we could establish a direct link between the *species* in the faculty of cogitation, the highest faculty of the sensitive soul, and the *species* inhering in the rational soul, and if we could solve the theoretical difficulties involved in establishing such a linkage, then we could justly stress the Aristotelian tendency in Bacon's thought. Then, of course, we would still have to give an account of the exact place and function of illumination and innate knowledge in Bacon's epistemology. However, if indeed *species* retain a place in the material and physical arena, and the possibility of their reception into the intellect is denied, then consequently the intellect would have to rely on either innate knowledge, divine illumination, or both to receive intelligible content.

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12) Ibid., 154.

13) Katherine H. Tachau, *Vision and Certitude in the Age of Ockham—Optics, Epistemology and the Foundations of Semantics 1250-1345* (Leiden, 1988), 11.

14) A. Mark Smith, "Picturing the Mind: The Representation of Thought in the Middle Ages and Renaissance," *Philosophical Topics* 20 (1992), 149–170, 158.

15) Smith attributes abstraction to Bacon in A. Mark Smith, *Alhacen's Theory of Visual Perception—A Critical Edition, with English Translation and Commentary, of the First Three Books of Alhacen's De Aspectibus, the Medieval Latin Version of Ibn al-Haytham's Kitab al- Manazir* (Philadelphia, 2001), vol. 1, xcvii. Tachau ascribes abstraction to Bacon in *Vision and Certitude*, 22 and 26.

A major difficulty in opting for the first view, is that, without presupposing any abstraction mechanism, Bacon held firmly to the corporeal qualification of *species* and defined its being as corporeal, material, and natural: "… a species of corporeal and material things will always have material and corporeal existence…."[16] So he wrote, and added: "Therefore, I say that species have material and natural existence in the medium and in sense ...."[17] Moreover, Bacon believed that every *species* represents its agent "in nature, definition, specific essence, and operation."[18] Thus, once a *species* loses its inherent corporeal nature, it can no longer accurately represent the natural world. Bacon devotes a whole chapter (3.2) of the *De multiplicatione specierum* to counter the claim raised by Aristotle, Averroes, and Avicenna that *species* of corporeal agents receive spiritual being in media and in sense.

Defending the Aristotelian thesis gets even more complex since Bacon held a weak notion of the intentional existence of *species* in media and sense. A comparison to the view of Thomas Aquinas may help clarify his notion. According to Pasnau, the intentional existence of the *species* of P, as defined by Aquinas, means that the *species* is received by a patient without the patient actually becoming P.[19] As Pasnau illustrates, when something is made hot, the heat exists naturally in the recipient; but if someone merely thinks about heat, the intellect is not thereby made hot.[20] Although Aquinas saw no incompatibility between intentionality and physicality, he frequently used the words "intentional" and "spiritual" as synonyms.[21] Bacon seems to hold to a different understanding of the adjective "intentional." He writes about the "intentional and false" (*intentionale*

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16) Bacon, *Perspectiva* 1.6.4, in David C. Lindberg, *Roger Bacon and the Origins of Perspectiva in the Middle Ages: A Critical Edition, with English Translation of Bacon's Perspectiva with Introduction and Notes* (Oxford, 1996), 88-89.

17) Bacon, *Perspectiva* 1.6.3, in Lindberg, *Roger Bacon and the Origins*, 83.

18) Bacon, *DMS* 1.1, ed. and trans. David C. Lindberg, *Roger Bacon's Philosophy*, 7.

19) Robert Pasnau, *Theories of Cognition in the Later Middle Ages* (Cambridge, 1997), 63.

20) Ibid., 33.

21) For example, in his commentary on the *De anima* II.24.45-56 he writes: "… for in the sense object it has natural existence, whereas in the sense it has intentional or spiritual existence." Quoted in Pasnau, *Theories of Cognition*, 40.

et vanum) existence of *species* and contrasts it with "real existence" (*rem veram*).[22] When specifying how a *species* differs from its issuing agent, he clings to the *species'* incompleteness. In all other respects, a *species* resembles its agent. The generation of *species*, as opposed to the complete generation characteristic of natural processes, is an incomplete one, in which "incomplete matter and incomplete form and an incomplete composite come into being…."[23] Compared to "real" beings, a *species* is so weak and deficient that it cannot be reckoned among the things of this world.[24] Yet this understanding of "intentional" as "incomplete," or having less being, does not make *species* either purely spiritual or separate from matter.

While Normore interprets Aquinas's *esse spirituale* as the presence of a form without the matter which usually accompanies it,[25] Bacon could never have accepted that a form might exist apart from its appropriate matter.[26] As Bacon explains it, the term "spiritual" which Aristotle, Avicenna, and Averroes used for sensory *species* "should be understood entirely to refer to insensible being," but there is no contradiction between insensibility and either corporeality or materiality. [27] Following this assertion, Pasnau infers that Bacon thought of *species* as "literal likenesses of external objects," which "make their recipients actually like their agents." "In Aquinas' terminology," Pasnau concludes, "they have natural existence."[28] This is not entirely accurate, since Bacon considered only the *species* of qualities like

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22) Bacon, *Questiones supra librum de causis* 9, eds. Robert Steele and Ferdinand M. Delorme, in *Opera hactenus inedita Rogeri Baconi*, fasc. 12 (=*OHI* 12) (Oxford, 1909–1940), 41.

23) Bacon, *DMS* 1.2, in Lindberg, *Roger Bacon's Philosophy* 31. On intentional existence in Bacon see also Tachau, *Vision and Certitude*, 12.

24) Bacon, *Communium naturalium*, 1.1.2.3, *OHI* 2, 23: "… et quanto minus esse potest de natura specifica agencium est in eis; propter quod non vocantur res, set magis similitudines rerum."

25) Calvin Normore, "The Matter of Thought," in *Representation and Objects of Thought in Medieval Philosophy*, ed. Henrik Lagerlund (Aldershot, 2006), 117-134, 130.

26) See the justification of clause (3) in this paper.

27) Bacon, *DMS* 3.2, in Lindberg, *Roger Bacon's Philosophy*, 193. As Tachau (*Vision and Certitude*, 15) notes, Averroes did not in fact assert that light has spiritual existence in its medium. What he actually wrote was that it is not a body (*corpus*) but an *intentio*.

28) Pasnau, *Theories of Cognition*, 65.

heat, light, and colour to be literal likenesses. He stressed that for other things, *species* cannot realize themselves as fully as their agents, but remain in a state of a being which is incomplete.[29] Yet this being would still be material; and, in Bacon's terminology, it would have natural existence just the same.

Bacon had limited his discussion of the natural being of *species* to *species* in material substances, such as the transparent medium, the sense organs, and the brain. On how *species* are received within the spiritual substance of the rational soul, he promised that "later we will investigate the species of corporeal things as they exist in the soul and intellect ...",[30] but he leaves this promise unfulfilled. I shall here try to fill the gap which Bacon left open, by arguing that—in the sense defined—the *species* in the rational soul remain natural, adding the note that in Bacon natural and intentional existence are not mutually exclusive.

My thesis in this paper is that according to Bacon (1) *species* do arrive in the intellect through the senses; (2) moreover, they do so without being abstracted from matter and while remaining corporeal; (3) *species* must arrive into the intellect as corporeal, since they represent not the form alone but the whole composite of matter and form; (4) corporeal *species* can be received into the rational soul since the soul itself is not purely spiritual but comprises matter and form, for up to a point, the rational soul operates naturally; (5) the function of both innate ideas and divine illumination in Bacon is relatively minor and consists in enabling the rational soul to recognize valid arguments and stabilize cognitive habits; (6) this seemingly awkward treatment of cognitive content by Bacon stems from his view of representation, which requires a strong linkage between mind and nature.

My thesis should be qualified as applying only to Bacon's mature writings. The exact chronology of Bacon's works is much debated, and for the present paper I use the rather loose division into "early" writings and "late" or "mature" ones. The commentaries on the various *Physics* and *Metaphysics* books, as well as on the *De causis*, all

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29) Bacon, *DMS* 1.1, in Lindberg, *Roger Bacon's Philosophy*, 13-15.
30) Bacon, *DMS* 3.2, in Lindberg, *Roger Bacon's Philosophy*, 191-193.

belong to the early phase of Bacon's career, in which he lectured at Paris. The three *opera* (*majus*, *minus* and *tertium*), the *Communium naturalium*, the *De signis*, and the *Compendium studii theologiae* were all written after 1250, that is after his return to Oxford and his supposedly crucial encounter with Grosseteste's writings. For various reasons, but mostly in light of the development of Bacon's thought on abstraction, I would date his questions on the *De causis* to the end of the early phase rather than to its midst as Rega Wood has suggested.[31]

The three main features in which the two periods of Bacon's career differ are his theory of the agent intellect, the development of his ideas on abstraction, and his theory on innate knowledge.[32] I will here sketch briefly the essentials of the developments in his theory of the agent intellect and then expand on abstraction, and innate knowledge in the appropriate sections.

Bowman, Dales, and others recognize three phases in Bacon's developing views on the agent intellect.[33] In the earlier commentaries, such as the questions on the *Metaphysics lambda*, Bacon teaches that the agent intellect is a part of the soul. In the second phase, following Avicenna and Alfarabi,[34] the agent intellect becomes a separate intelligence, placed outside the soul, yet it is still a created being. This second phase appears in writings such as the questions on the *De causis,* and the various questions on the *Physics*.[35] The third phase characterizes Bacon's mature writings and is the one presented in the *Opus majus*, where the active intellect is identified

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31) Wood, "Imagination," 28-57, 53.

32) Other aspects can be added to the list, most notably the new stress on the importance of mathematics and experimental science for *scientia*, which characterized his mature period of writing. However, these aspects are irrelevant for the thesis I am advocating here.

33) See Leonard J. Bowman, "The Development of the Doctrine of the Agent Intellect in the Franciscan School of the Thirteenth Century," *Modern Schoolman* 50 (1973), 251-279, at 257 ; Richard C. Dales, *The Problem of the Rational Soul in the Thirteenth Century* (Leiden, 1995), 76-77; Crowley, *Roger Bacon*, 182-191; Wood, "Imagination," 54.

34) See Wood, "Imagination," 54.

35) Spruit, *Species Intelligibilis*, 154-155; Wood, "Imagination," 54.

with God.[36] This last phase rested on the argument that if the agent intellect knows all things and is always *in actu*, then it cannot be a part of the rational soul but God alone, since only God fits this description.[37] Bacon also referred to the analogies Aristotle had used to illustrate the relation between the agent and possible intellects: the artificer to his materials, the light of the sun to colors, and the sailor to the ship. All these, he concluded, entail an essential separation between the active element and the passive one.[38]

Given these changes in Bacon's thought, I shall limit my argument to the correct reading of Bacon's mature works alone, although at times will seek clarifications from some of the earlier texts, and especially from the *De causis*, which I consider to be a key text in the development of Bacon's thought. I will now attempt to justify each step in my argument as I stated it above.

1. Through the Senses to the Intellect

Several texts show that Bacon thought of the intellect as the receiver of *species* coming from the senses. For instance, in the *Communium naturalium* he explains foolishness as resulting from the inability of *species* to enter the intellect:

> For the truth is that the powers of the sensitive soul are in the service of the intellect, and when they are injured … then the operation of understanding is hindered, because there is an error in perception and the *species* cannot reach the intellect according to their proper and true being; on the contrary, the being of the species is destroyed so that the intellect cannot be informed....[39]

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36) Crowley, *Roger Bacon*, 165-166. See also Bowman, "The Development," 257.

37) Bacon, *Opus majus* 2.5, in *Opus Majus of Roger Bacon*, ed. Robert B. Burke, 2 vols. (Philadelphia, 1928), 44-45; see Bowman, "The Development," 257-258.

38) Bacon, *Opus majus* 2.5, in Burke, 44-45. In the next two pages (46-47) Bacon brings up some more considerations supporting his view that the agent intellect is in fact God. Crowley (*Roger Bacon*, 187) speculates that the decisive factor was the influence of Grosseteste and Adam Marsh, and Bacon himself claims he was influenced by William of Auvergne.

39) Bacon, *Communium naturalium* 1.4.2.3, *OHI* 2, 288: "Nam verum est quod virtutes sensitive deserviunt intellectui, et quando leduntur… tunc impeditur operacio intelligendi, quia error est in sensitiva et non potest species venire ad intellectum

S*pecies* coming from the senses are thus essential and indispensable for the proper functioning of the intellect. When they cannot arrive in the intellect, or when they get distorted on their way, the intellect cannot function properly. In the *Opus majus*, Bacon portrays the rational soul as added to the sensitive soul from without and united to it "primarily and immediately" through the cogitative faculty. Then he turns to speak of *species*: "and species are produced in the rational soul by the cogitative faculty."[40]

In the *De causis* Bacon invokes the principle that whatever the inferior power can do, a superior power can do even more effectively:

> … the sensitive power, which is lower than the intellective soul, can have within itself the species of sensible things, through which it understands [those sensible things]; therefore in a similar manner … the intellective soul knows corporeal sensible things, since it is more powerful than the sensitive soul …. And this is how [the intellect] holds the species of sensible things within itself.[41]

Since the intellective soul is more powerful than the sensitive, it follows that if the former can be united with sensible *species* and holds them in itself, then so can the latter.

2. Abstraction Abandoned

In his earlier writings Bacon indeed described *species* as being abstracted from their material conditions on their way to the intellect.[42] In his mature writings, however, not only is there no such

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secundum rectum esse et veritatem; immo destruitur esse speciei ut intellectus non possit informari ...."

40) Bacon *Perspectiva* 1.1.5, in Lindberg, *Roger Bacon and the Origins*, 17. Also in the *DMS* 1.2, in Lindberg, *Roger Bacon's Philosophy*, 43, Bacon states that *species* of singulars as well as of universals are repeated in medium, sense, and intellect.

41) Bacon, *De causis* 14, *OHI* 12, 72: "… virtus sensitiva, que est inferior anima intellectiva, potest apud se habere species sensibilium per quas cognoscit ipsa, ergo similiter …. anima intellectiva cognoscit res corporales sensibiles cum sit potentior quam sensitiva …. et ita habet species rerum sensibilium apud se."

42) In the *Quaestiones supra libros quatuor physicorum Aristotelis*, *OHI* 8, 31, he describes the phantasms as being abstracted from their material conditions, and in the *De*

description, but Bacon denies abstraction—at least in the sense of the separation of form from matter—outright. On the reception of *species* into the sensitive soul, he writes:

> ... as regards what Aristotle says in *De anima*, book II, that sense receives the species of sensible things without matter, it is replied that he there uses "without matter," that is, "immaterial" to mean "insensible" rather than "spiritual."[43]

It is not true that the senses receive the sensible *species* without their matter; Aristotle's intention had been misunderstood. Alongside the abstraction of form from matter, Bacon also denies that universals are created from particulars, which was normally considered an act of abstraction; indeed he declares that view to be superfluous and false:

> ... a universal issues into being through the operation of nature .... But the apprehension of the mind contributes nothing to the operation of nature; therefore it is most vain to say that the mind makes a universal.[44]

At the mature stage of his thought, Bacon held that universals were not products of rational processes, nor were they exclusively received by the intellect from some innate or supernatural source. On the contrary, Bacon thought universals were a part of nature and were received into the intellect through the faculty of estimation. He denied that the rational soul was the cause of universality; for even if it did not apprehend particular things, they would still resemble one another.[45] The universal within the intellect is not the actual universal but its likeness or *species*. The intellect does not need to

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causis 10, *OHI* 12, 59-60 he says the same of the *species* in memory and phantasy. In both cases the task of abstraction is performed by the agent intellect "beaming forth." Abstraction of *species* is also mentioned in the *Questiones supra primum Metaphisice*, *OHI* 11, 12.

43) Bacon, *DMS* 3.2, in Lindberg, *Roger Bacon's Philosophy*, 193.

44) Bacon, *Communium naturalium* 9.57, in *Three Treatments of Universals by Roger Bacon—A Translation with Introduction and Notes*, ed. and tr. Thomas S. Maloney (Binghamton, NY, 1989), 98.

45) See Dorothy E. Sharp, *Franciscan Philosophy at Oxford in the Thirteenth Century* (Oxford, 1930), 145; Maurer, *Medieval Philosophy*, 135.

abstract general concepts from many particulars, because it receives the *species* of universals ready-made.[46]

Bacon replaced the theory of abstraction with the principle of incorporation. According to this principle, to express the information it carries, a *species* must be incorporated within the right kind of medium. Thus, for example, the *species* of the proper sensibles are expressed within the external senses, the *species* of substances and complexions by the faculties of estimation and cogitation, and the *species* of universals by the intellect. A *species*' content is not extracted but rather expressed when it is incorporated within a suitable matter.[47]

The absence of abstraction from Bacon's mature writings has been noted by both Spruit[48] and Hackett, who wrote: "*Opus maius* V contains the physiological and mathematical basis for Bacon's theory of mind .... Most significant is what is missing: there is no theory of abstraction."[49] To ground my argument on more than just Bacon's silence, I propose to examine how abstraction in Bacon gets pushed aside by the full implementation of the principles that he had laid down for the propagation of *species*.

In the questions on the *De causis* the abstraction of *species* is treated, confusingly, alongside an argument that no such abstraction is necessary. Bacon begins his argument by distinguishing *species* having determinate dimensions from *species* having indeterminate ones. He rules that *species* of the first kind cannot be received into the soul, while *species* of indeterminate dimensions, arising in prime matter, "are not incompatible with the simplicity of the soul."[50]

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46) In developing his notion of universals as issued from the things themselves Bacon has been influenced by Alhacen. According to Alhacen the universal form arrives into the eye together with the particular form. However, unlike Bacon Alhacen required repeated encounters with the universal form, as well as certain workings of abstraction so that the universal form would be impressed in one's imagination. Bacon went a few steps further. For Alhacen's account see his *De aspectibus* II.4.16 in Smith, *Alhacen's Theory*, 518.

47) For a description of the principle of incorporation see A. Mark Smith, "Getting the Big Picture in Perspectivist Optics," *Isis*, 72/4 (1981), 568-589.

48) Spruit, *Species Intelligibilis*, 154.

49) Hackett, "Roger Bacon," 623.

50) Bacon, *De causis* 10, *OHI* 12, 72, "… tales non repugnant simplici anime."

Bacon's use of Averroes' notion of indeterminate dimensions here is interesting. Averroes observed that the four elements share the attribute of divisibility as a common property, while divisibility, in turn, presupposes the possession of quantity. The forms of the four elements impose upon prime matter a set of determinate quantities, but prior to such an imposition, prime matter possess an indeterminate three-dimensionality only. Averroes identified this indeterminate extension with the corporeal form.[51] Bacon, in turn, considered that *species* representing the forms which inhere in prime matter, namely *species* of universals and substances, possess an indeterminate extension in the same way as prime matter does prior to the imposition of a substantial form. He assumed that this kind of indefinite extension can be received in the rational soul.

Yet there is a difficulty here: prime matter is not an active nature and therefore cannot issue its own *species*.[52] Bacon therefore explains that the *species* of universals are produced in the singular *species*, for a singular *species* cannot exist without the universal one and vice versa.[53]

The *species* of both universals and singulars are received in the intellect together:

> But from whichever particular arrives one species of a universal with the species of the particular, the species of universals are multiplied accordingly in the soul, and consequently the soul becomes stronger and more capable of bringing us to understand universals; and that is why the universals are called the objects of the intellect. But this is [done] by using an epithet instead of a name (*antonomasiam*), and without excluding singulars…[54]

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51) See Arthur Hayman, "Aristotle's 'First Matter' and Avicenna's and Averroes' 'Corporeal Form,'" *Harry Austryn Wolfson—Jubilee Volume, On the Occasion of his Seventy-Fifth Birthday*, vol. 1 (Jerusalem, 1965), 385-406, 403.

52) In the *Quaestiones supra librum de sensu et sensato* 8, *OHI* 14, 29 Bacon lays down the principle that not only light but every active nature issues its own *species*. In the *DMS* 1.2, 41 he states that "the species of prime matter is not generated, but [only] of specific matter."

53) Bacon, *DMS* 1.2, 43.

54) Bacon, *Communium naturalium* 1.23.4, *OHI* 2, 104. "… set a quolibet singulari venit una species universalis cum specie singulari, et ideo multiplicatur species universalis in anima, et ideo fit fortior at potentior ad hoc ut per eam intelligamus

Universals are called the object of the intellect because they can be realized only by the intellect and not by the senses. Yet that does not exclude *species* of particulars from the intelligible realm. Both *species* of particulars and those of universals eventually reach the intellect, the difference being that *species* of particulars are also dealt with at an earlier stage, at the sensory level. It quickly becomes clear that it is not only the *species* of universals and substances—representing qualities which inhere in prime matter—that are devoid of determinate quantity. The group of *species* with fixed dimensions remains empty:

> Yet quantity, since it is bound up with matter, is not an active nature and so does not multiply its species; and because of this, its species is not under quantitative dimensions but only concerns a body inasmuch as it is a substance and therefore is received into the intellective soul.[55]

Species of material things do not represent the quantities of their issuing objects. According to Bacon, quantities and many other visual qualities, do not send forth *species*. Size, magnitude, distance, and the like are attributes that the intellect deduces from the arrangement of the *species* of light and color on the lens: "only the species of color and light are [actually] arranged on the pupil and not the species of magnitude itself."[56] That arrangement reflects the original proportions within the issuing object, since the propagation of *species* occurs in straight lines according to the laws of geometry.

Bacon's argument seems to be this: if *species* were endowed with fixed dimensions, they could not find their way into the intellect.

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universale, et ideo universalia vocantur objecta intellectus. Set hoc est per antonomasiam non per exclusionem singularis…"

55) Bacon, *De causis* 10, *OHI* 12, 73: "Quantitas autem, cum materie debeatur, non est natura activa, ideo non multiplicat sui speciem, et propter hoc species non est sub dimensionibus quantitativis, set solum refertur ad corpus in quantum substantia est, et ideo in anima intellectiva recipitur."

56) Bacon, *DMS* 1.2, in Lindberg, *Roger Bacon's Philosophy,* 40-41. This explanation of visual sensation was derived from Alhacen. For the details of Alhacen's account see Smith, *Alhacen's Theory*, lxviii–lxxiii. See also Abdelhamid I. Sabra, "Sensation and Inference in Alhacen's Theory of Visual Perception," in *Studies in Perception*, ed. Peter Machamer and Robert Turnbull (Columbus, 1978), 160–85.

But since the range of qualities represented by *species* does not include quantitative ones, and since dimensionality is a quantitative property, *species* do not have to resemble the dimensional properties of their agents and therefore can be received into the intellect.

In the *DMS* Bacon makes his point again: a *species* is an incomplete entity and therefore does not exist of itself but always in something else. It is only through that something else, which becomes its material cause, that a *species* comes to resemble its agent. It is therefore only through that very material cause that place, position, and dimensions can be ascribed to *species*.[57] Thus a *species* need not be abstracted upon its reception into the intellect. It receives dimensions from its host; and by its very nature, it suits the intellect, which is itself devoid of spatial characterization.

3. *Species* Represent Matter and not Form Alone

One explanation for Bacon's dispensing with abstraction is his conviction that representation by form alone does not suffice to assure accurate correspondence between mind and nature. In several places he insists that a *species* represents the composite of form and matter rather than the form alone:

> … it has been proved above that the species of a corporeal substance is the similitude of the whole composite, and that when a species is generated not only is its formal being produced in the medium, but also material being and true matter having incomplete being.[58]

In arguing for the view that a name is principally imposed to signify the composite of matter and form rather than the form alone, Bacon makes an interesting statement about the things that are best comprehended by the intellect:

> Just as each thing bears itself in relation to [its] being, [it presents itself] to an intellect in the same way, as Aristotle says in the first [book] of the *Metaphysics*.

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57) Bacon, *DMS* 3.1, in Lindberg, *Roger Bacon's Philosophy,* 181.

58) Bacon, *DMS* 3.2, in Lindberg, *Roger Bacon's Philosophy,* 191. See also *DMS* 1.2, 29-31.

> But a composite has a more complete [type of] being than form, since it has the being of matter in addition to the being of form. Because of this it can more truly and properly be understood, as far as it is concerned, and therefore be named.[59]

Since a composite has a more complete being than that of a separate form, a *species* representing both the formal and material aspects of its agent would be more perfect than a *species* representing its formal aspect alone. A composite *species* therefore, not only provides the most faithful representation, but given its greater perfection is also more readily and quickly grasped by the intellect. This principle interlaces well with Bacon's insistence in the *Opus majus* that "spiritual facts are discovered through corporeal effects,"[60] and that since our intellect is associated with continuity and time we grasp quantities and bodies directly, but not the forms of incorporeal things. Even if incorporeal forms were available to our understanding, Bacon proceeds, we would not perceive them, "owing to the more vigorous occupation of our intellect in respect to bodies and quantities."[61]

4. The Rational Soul Includes Matter and Form

Yet if the intellect can receive *species* of both matter and form, it cannot be defined as purely spiritual. Bacon refers in some places to the respects in which the intellective soul can be called corporeal and discerns different degrees of corporeality or materiality. For example, in his second set of questions on the *Metaphysics* he distinguishes between a body (*corpus*) and two kinds of corporeal things (*corporeum* and *corporale*). He classifies the intellective soul as *corporalis* because it is conferred on a body, yet he notes that it remains separate and extrinsic from that body.[62] Once again, in his questions

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59) Bacon, *Compendium of the Study of Theology* 3.76, ed. and trans. Thomas S. Maloney (Leiden, 1988), 81. Compare this statement with Aquinas: "… the more immaterially a thing receives the form of the thing known, the more perfect is its knowledge," *Summa Theologiae* 84.2. The disparity between Aquinas and Bacon is striking.

60) Bacon, *Opus majus* 4.3, in Burke, 124.

61) Bacon, *Opus majus* 4.3, in Burke, 126.

62) Bacon, *Questiones altere super libros prime philosophie Aristotelis* (*Metaphysica I-V*) in Maloney, *Three Treatments*, 56.

on the *Metaphysics*, he writes that the intellective soul can be called material since it is born with matter.[63]

Bacon seems to have found a satisfactory answer to his doubts about the ontological status of the intellective soul in the doctrine of universal hylomorphism. According to this theory, all substances except God consist of matter and form, whereas only God is entirely immaterial. Substances such as angels and the human soul are distinguished as spiritual matter from the matter of physical, sensible objects.[64] As a staunch supporter of this doctrine, Bacon held to the view that every finite being is essentially composite and so a simple finite being is a contradiction in terms. As receptors of divine light, both a human soul and an angel ought to be material, since matter is the principle of receptivity.[65] Accordingly, Bacon emphasized that the rational soul is not purely spiritual but composed of both matter and form:

> … but I hold for certain that the soul is composed from matter and form, just like the angels; for the question is the same concerning the angels and rational souls.[66]

Rational souls are separate from sensible and corporeal matter but not from spiritual matter. Bacon then links the materiality of *species* with the materiality of the soul:

> And therefore this is as false as to maintain that a species has spiritual being ... since an angel and soul, although spiritual substances, nevertheless exist in matter, since they are composites of true matter and form ....[67]

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63) Bacon, *Questiones supra undecimum prime philosophie Aristotelis, OHI* 6, 18.

64) Paul Vincent Spade, "*Binarium Famosissimum*," *The Stanford Encyclopaedia of Philosophy* (Fall 2003 Edition), ed. Edward N. Zalta, URL = <http://plato.stanford.edu/archives/fall2003/entries/binarium/>.

65) Crowley, *Roger Bacon*, 82-83.

66) Bacon, *Communium naturalium* 1.4.3.4, *OHI* 6, 291: "…Set ego teneo pro certo quod anima est composita ex materia et forma sicut angeli; eadem enim est questio de angelis et de animabus racionalibus." A similar statement appears in the *DMS* 3.2, in Lindberg, *Roger Bacon's Philosophy*, 191.

67) Bacon, *DMS* 3.2, in Lindberg, *Roger Bacon's Philosophy*, 191.

Considered in this way, the reception of *species*, which have no fixed dimensions and which represent both matter and form, within the intellective soul, which is likewise dimensionless and which is also a composite, becomes plausible.

Yet there seems to be another difficulty with the reception of *species* into the intellect, a difficulty which has to do with the status which Bacon had given to *species* as "natural." Bacon defines the intellect as a "rational substance" and deems it rational because it operates using deliberation and free will.[68] By contrast, Bacon characterizes natural action by the attributes of uniformity and necessity:

> … for only an agent that possesses free will and acts by deliberation can, for its part, act difformly. But a natural agent possesses neither will nor the ability to deliberate, and therefore it acts uniformly …[69]

The will as a basis for rational action is free to choose its course of action. Natural action is instinctive, immediate, and inherently deterministic.

Within the context of his classification of signs to the categories of "natural" and "given by soul," Bacon notes that some signs given by soul should also be considered natural. He provides the example of a dog's bark, which is natural because it is instinctive, automatic, immediate, and given "as if suddenly in the absence of perceptible time, and with a certain natural instinct and impetus …."[70] Bacon feels a need to explain in what sense a soul can be said to act naturally. Turning to Aristotle, he writes:

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68) Bacon, *Communium naturalium* 1.2.4.6, *OHI* 2, 108: "intellectus autem hic vocatur substancia racionalis, que operatur ex deliberacione racionis et eleccione voluntatis."

69) Bacon, *DMS* 1.1, in Lindberg, *Roger Bacon's Philosophy*, 19.

70) Bacon, *De signis* 8, in K. Margareta Fredborg, Lauge Nielsen and Jan Pinborg, "An Unedited Part of Roger Bacon's *Opus Majus*: De Signis," *Traditio* 34 (1978), 75-136, at 83: "…quasi subito per privationem temporis sensibilis et quodam instinctu naturali et impetu naturae …"

> But in the second [book of the] *Physica* [nature] is considered more broadly than [in the *De anima*] as a force acting without deliberation whether in animate or inanimate things. Thus a soul can be included under nature in one way.[71]

Nature and reason are opposed. Yet even though the intellect as a whole is called "rational substance," in fact only some of its operations are truly rational. According to Bacon, any act—even if performed by the rational soul—which does not make use of deliberation should be considered natural:

> … the rational substance acts in many ways without deliberation and the choice of the will, therefore with regard to these actions it is said to act through nature ….[72]

Is the reception of *species* into the intellect a deliberative or natural act? Bacon's answer is clear-cut:

> For the rational soul does many things as by nature and many without deliberating.... And just, insofar as concerns the practical intellect, it has natural affections of this kind, in resemblance to animals, so likewise it has many natural cognitions and apprehensions and reflections [which it performs] without the exercise and deliberation of reason and without full use of it.[73]

The intellective soul does not always act by fully using its rational capabilities. In fact, many of its cognitions and apprehensions are received without exercising reason or use of its free will at all. In receiving *species*, the rational soul is passive; it is not at liberty to choose which of the apprehensions to accept and which to reject.

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71) Bacon, *De signis* 13, in Fredborg et al., "An Unedited Part ," 85. Translated by Maloney, 1988, 139.

72) Bacon, *Communium naturalium* 1.2.4.6, *OHI* 2, 108: "…substancia racionalis multa agit sine deliberacione et eleccione voluntatis, ideo respectu illarum accionum dicitur agens per naturam…."

73) Bacon, *De signis* 12, in Fredborg et al., "An Unedited Part," 85: "Anima enim rationalis multa facit ut natura et multa ut non deliberans …. Et sicut quantum ad intellectum practicum habet huiusmodi naurales affectiones ad similitudinem brutorum, sic similiter habet multas cognitiones et apprehesiones naturales et cogitationes dine [read sine] decursu et deliberatione rationis et sine pleno usu eiusdem."

One must bear in mind that there is a difference between rational operations and cognitive ones. While the internal senses, according to Bacon, perform certain cognitive functions, these are not rational functions as such. Even some of the intellect's functions are cognitive but not rational.[74] The dividing line between nature and reason is no longer found between the sensitive soul and the rational one, but is now drawn within the rational soul itself.

5. Innate Ideas and Divine Illumination Incidental to Knowledge

One of Spruit's arguments against the reception of *species* within the intellect is a passage from the questions on *Physics V*, where Bacon quotes Augustine's view on innate knowledge:

> Many authorities are against this. First is the saying of Augustine "the soul is brought into being in the likeness of all wisdom, carrying within itself the species of all things," and in the third part of *De Anima* [Aristotle writes] that "in a certain measure the soul is everything"; and so, according to these authorities it would seem that the soul has an innate cognition of all things.[75]

In this text, Bacon cites Augustine's hypothesis that the soul is created from the outset having the *species* of all things within it. These *species* are therefore not acquired but innate. Bacon indeed cites Augustine as well as Boethius on this point, but he immediately qualifies that "it is possible to call that intelligence the natural appetite or desire to know, and it is in this way that knowledge is innate."[76] Bacon believed that Augustine and Boethius were right in asserting that the rational soul is created with the *species* of all things in it; and as Wood notes, this was the standard early

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74) This distinction is spoken of in Tachau, *Vision and Certitude*, 10.

75) Bacon, *Quatuor physicorum*, *OHI* 8, 2: "Contra sunt multe auctoritates, prima Augustini dicentis 'anima est ad (similitudinem) totius sapientie procreata species omnium rerum in se gerens' et in tertio *De Anima* 'quodammodo anima est omnia'; et ita per has auctoritates videtur quod anime sit rerum omnium cognitio innata."

76) Bacon, *Quatuor physicorum*, *OHI* 8, 3: "… potest nominare scientia naturalem appetitum vel desiderium ad sciendum, et hoc modo scientia est innata; et de hoc procedunt ultime auctoritates."

thirteenth-century opinion.[77] Yet he considered that once the soul is united to the body, our access to these innate *species* is hindered. In his first set of questions on the *Metaphysics* he stated that

> …. knowledge can be discussed in two ways: in one way, by the very fact that it is knowledge, it arises as a disposition or affection of the soul, inclining to the affection of the good and the investigation of truth; and this is an imperfect and confused knowledge, which is innate ….[78]

Although in two of his earliest works Bacon mentions functioning innate exemplars, as his thought develops he begins to describe innate knowledge as vague and indistinct.[79] In his mature writings innate knowledge as specific or even general information is out of the question. In the works sent to the Pope innate knowledge is not even discussed, and it is replaced—if at all—by innate capacities. One rare example is found in the *Opus tertium*, where Bacon regards the human ability to articulate arguments and recognize logical fallacies as innate:

> Therefore we have another course of argument besides the one given by the method of Aristotle; yet it is none other than innate. What remains then, is that we know how to provide proofs from nature, and likewise how to refute arguments by destroying false premises and by dividing and distinguishing bad conclusions.[80]

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77) Wood, "Imagination," 47.

78) Bacon, *Primum metaphisice, OHI* 11, 9: "… de scientia dupliciter est loqui; uno modo ut per hoc quod est scientia nascatur anime dispositio vel affectio inclinans ad boni affectionem et veri speculationem, et hec est scientia imperfecta et confusa, et hec est innata …."

79) For the details of this development see Wood, "Imagination," 52-53 . The unclarity of innate knowledge and the need for acquired *species* or phantasms is discussed, among other passages, in the *Quaestiones supra libros octo physicorum*, *OHI* 13, 11; *De causis* 10, *OHI* 12, 74. In the *De causis* 10, *OHI* 12, 75 Bacon states that innate *species* would only be useful for a child as a starting point in his quest for knowledge or after the soul was separated from the body. In this life, however, we are bound to rely on acquired *species*.

80) Bacon, *Opus tertium* 28, ed. J.S. Brewer, in *Opera quaedam hactenus inedita* (London, 1859), 104-105, "Ergo aliud regimen arguendi habemus quam per artem Aristotelis datum; sed non est aliud quam innatum. Relinquitur igitur quod a natura scimus arguere, et similiter dissolvere argumenta per interemptionem propositionum falsarum, et per divisionem et distinctionem malarum consequentiarum." In the *Opus*

To sum up: a soul is born with the innate *species* of all things. Unfortunately, however, it cannot access the information stored in those *species* in this life, for this information gets blurred once it is united to the flesh. Innate *species* only provide a confused starting point to our acquaintance with the world and a general guidance to distinguish true from false reasoning. In no way does innate content furnish distinct and reliable information.

But perhaps divine illumination does. In his early writings Bacon referred to divine illumination as the source of the Platonic exemplars,[81] and as providing information to the possible intellect by a direct infusion of *species*.[82] Yet in much the same way as in his treatment of innate knowledge, he came to discount of divine illumination as a source of knowledge:

> … the species of the agent intellect are distinct according to themselves, yet because of the weakness of light and their distance from the first cause, there is darkness and obscurity there…. The possible intellect is informed by the agent intellect by gazing upon it, but receives only confused cognition in this way.[83]

Owing to their distance from God, humans cannot make full use of the information supplied by illumination, and it appears to them

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majus 4.3 (Burke, 121) Bacon treats the ability to comprehend mathematical truths as an innate capacity.

81) Bacon, *Questiones supra undecimum prime philosophie Aristotelis* (*Metaphysica XII*)*, primae et secundae*, *OHI* 7, 15-16 and 110; *Quatuor physicorum*, *OHI* 8, 2-3.

82) Bacon, "*undecimum prime philosophie," OHI* 7, 110: "… et hec vocatur intellectus agens, et hec non intelligit rem per administrationem sensuum, set per exempla sibi innata…"; *Octo physicorum, OHI* 13, 9: "Preterea, ex presentia agentis proportionalis cum materia derelinquitur effectus; ergo cum intellectus sit hujusmodi, ergo derelinquit effectum intelligendi in possibili; ergo fit per species agentis. Quod concedo: et fit per species alienas, scilicet per species agentis…." And in the next page (10): "… alia est cognitio precedens istam et hoc per species agentis, et hec non cum fantasmate…. Et est duplex modus ponendi hoc: aut quod intellectus agens informat intellectum possibilem et ponat ibi suas species, aut quia intellectus possibilis intueatur ipsum agentem."

83) Bacon, Octo *physicorum*, *OHI* 13, 9-10: "… species agentis sunt distincte secundum se, propter tamen defectum luminis et elongationem cause prime est ibi obscuritas tenebrositas… intellectus possibilis informatur quantum ad cognitionem confusam per intuitionem in agente."

as indistinct. In Bacon's mature writings there is no mention of infused *species*, and the illumination coming from the agent intellect serves to activate the possible intellect, thereby enabling it to handle the incoming *species* and grasp the information they bring up. In the *Communium naturalium* Bacon assigns the agent intellect the function of recognizing truthful arguments.[84] He then explains that knowledge through hearing of words is gained:

> … in part by the teacher showing and explaining, in part by the experience of the senses and in part by the influence of the agent [intellect]. For the thing can be shown and exemplified to vision by the instructor, and the species of the thing arrives in the intellect through sense, and the agent intellect illumines, and in this way stable knowledge (*habitus cognitivus*) is born in the soul ….[85]

The agent intellect helps the possible to stabilize and assimilate the acquired *species*, thus creating cognitive habits.[86] Not a word appears here to link the illumination coming from the agent intellect with abstraction, universality, or any specific content. Divine illumination in Bacon serves to stabilize knowledge, not to construct it. In the *Opus tertium* he writes:

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84) Bacon, *Communium naturalium* 1.3, *OHI* 3, 289.

85) Ibid., 289-290: "… partim per magistrum ostendentem et exemplificantem, et partim per sensus experienciam et partim per influenciam agentis. Nam res per doctorem potest visui ostendi et exemplificari, et species rei venit ad intellectum per sensum, et intellectus agens illustrat, et sic nascitur in anima habitus cognitivus.…"

86) The terms Bacon normally uses when discussing intelligibles are *species* and cognitive habits, by which he means *species* that have settled and stabilized. When discussing the *species* in the intellect as basis for acts of naming by imposition (such a discussion appears in the *De signis* 162 and 164, in Fredborg et al., "An Unedited Part," 75-136, 132-133), he also uses the terms *conceptus mentis*, *cognito* or *cogitatio*, *affectio*, *intellectus rei* and *notitia*. He does not define or differentiate between the various terms, and it seems as though he views them as synonyms. In the *Communium naturalium* 1.2.4.1, *OHI* 2, 110 he defines *conceptus* as an apprehension by which the soul grasps a thing and understands it, and ascribes the ability to form such concepts to animals too. According to Bacon therefore, concepts can be found not only in the intellectual faculties, but in the sensitive ones too. See Tachau's discussion in *Vision and Certitude*, 16.

> … and that which has the power to [acquire] knowledge (*scientia*) is called the possible intellect, and does not have [knowledge] from itself; but when it receives the species of things, and the agent flows into and illumines it, then knowledge (*scientia*) is born in it ….[87]

Acquired *species* remain the main source for *scientia*. Bacon accepts divine illumination as essential to knowledge, but this does not render sensible *species* superfluous, or exempt him from explaining how they are received into the intellect. Moreover, Bacon also fails to explain exactly how divine illumination contributes to *scientia*. The attention he devotes to the study of external experience, as compared with his scant and fuzzy remarks about illumination, is striking. Even if one chooses to disregard the various comments of his Aristotelian lectures and to concentrate on his mature writings alone, one cannot fail to notice that his discussion of spiritual experience is remarkably brief, whereas his treatment of natural, external experience is detailed, systematic and thorough.[88]

It is interesting to note that in his mature writings most of the remarks related to divine illumination appear in the *Opus majus* and are concentrated in the part on philosophy and in the first chapter of the part on experimental science.[89] By contrast, in the *Communium naturalium*, which was Bacon's *scriptum principale* in which he actually carried out the principles laid down in the *Opus majus*,[90] illumination is mentioned only in two places: the first is quoted above, and in another place he states that since our intellect belongs to the realm of time and succession, we cannot perceive spiritual and eternal things in this life without spiritual illumination.[91] Divine illumination is altogether absent from the *DMS*.

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87) Bacon, *Opus tertium* 23, in Brewer, 74: "… et intellectus possibilis vocatur qui est in potentia ad scientiam, et non habet eam de se; sed quando recipit species rerum, et agens influit et illuminat ipsum, tum nascitur scientia in eo …"

88) Rega Wood, "Imagination," 56, has also drawn attention to this point.

89) Bacon, *Opus majus* 6.1, in Burke, 585-587.

90) See Andrew G. Little, "On Roger Bacon's Life and Works," in idem, ed., *Roger Bacon Essays—Contributed by Various Writers on the Occasion of the Commemoration of the Seventh Centenary of his Birth* (Oxford, 1914), 1-32, 11; Sharp, *Franciscan Philosophy*, 116.

91) Bacon, *Communium naturalium* 1.3.1.8, in *OHI* 2, 175.

In his introduction to this work, Lindberg notes that, "Bacon's work exhibits little in the way of a theology of light …. Bacon was certainly influenced by Augustine's theory of divine illumination, but nothing of this appears in the *DMS* or *DSC*."[92]

One must bear in mind the purpose for which the *Opus majus* was written: it was a research proposal, a plea intended to obtain support and sponsorship from the papal court, including a release from the censorship imposed by the Chapter of Narbonne.[93] As such it was designed to appeal to the potential financer's perceived interests. Accordingly, Bacon assures the Pope in those works that his entire research plan is not opposed to the divine wisdom but is in fact comprised within it, for all wisdom is from God and cannot contradict the scriptures.[94] His identification of the agent intellect with God[95] is made within that context; and while he presents it along with a set of philosophical justifications, it cannot be taken in isolation or explained purely in philosophical terms.

6. Reliable Representation Requires Tight Linkage between Nature and Mind

I am not in a position to judge whether Bacon was making a conscious attempt to "naturalize" the mind or whether this was an unintended outcome from the principles he wished to employ. Nevertheless it seems evident to me that he did call for a strong linkage and a real connection between extra-mental reality and concepts, and that it was this requirement which led him to treat the intellect in naturalistic terms. For as Tachau puts it, once concepts are not seen as created by the mind and are therefore not arbitrary associations or divisions, and once the rules for the reliability of judgments have been laid down, then the *species* of an object becomes

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92) Lindberg, *Roger Bacon's Philosophy*, xlii, n. 30.

93) See Lindberg, *Roger Bacon's Philosophy*, xxiii; Brian Clegg, *The First Scientist—A Life of Roger Bacon* (New York, 2003), 80.

94) Bacon, *Opus majus*, 2.3; 2.5; 2.7; 2.9, in Burke, 39, 48, 49, 52 respectively.

95) Bacon, *Opus majus*, 2.5, in Burke, 43-48.

ipso facto veridical.[96] Yet my hunch is that there is more to it than that. After all, Bacon did posit some inferential operations at the sensory level, including comparison, discrimination and correlation.[97] I suggest that what might be at stake here is rather the nature of representation that Bacon requires. Perhaps the best way to understand Bacon's concept of representation would be to contrast it with that of Aquinas. Aquinas distinguished between likeness as agreement in nature and likeness as regards representation. He stipulated that for the purpose of cognition, only likeness as regards representation is required. Aquinas obviously believed that the absence of a natural likeness was no barrier to representational likeness.[98] Bacon, however, disagreed. He required natural likeness all the way through; and this was, in my view, the principal motivation for his naturalistic understanding of the intellect.

Conclusions

Since in his mature writings Bacon detaches the agent intellect from the human soul and identifies it with God, the human intellect is left with a material intellective soul, which is not even wholly rational. The human intellect is deemed material, yet it is so in a special sense. It is not the kind of matter perceived by the senses, nor the kind subject to physical laws. Since Bacon also defines the material *species* as insensible, and since they do not, properly speaking, occupy a well-determined space and are not, in fact, "things" (*res*),[99] then although they are considered natural and an inseparable part

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96) Tachau, *Vision and Certitude*, 17.

97) For example, the twenty visible intentions are deduced by a proto-syllogistic reasoning from the *species* of light and color. In general, Bacon tends to transfer cognitive operations to the sensitive soul, up to the point of concept formation. Due to considerations of length, this matter is not discussed here.

98) See the discussion in Pasnau, *Theories of Cognition*, 106-107.

99) In the *De causis* 10, *OHI* 12, 41, Bacon emphasizes the intentional and false (*intentionale et vanum*) existence of *species* and contrasts it with real existence (*rem veram*). He seems to hold that the very essence of *species* lies in its being incomplete. Once a *species* fulfills its mission and renders the patient—that is, the one in which it is received—similar to the agent, it ceases to be a *species* and becomes a *res*.

of physical processes, their reception within the intellect's "spiritual matter" does not seem to be problematic. The possible intellect thus becomes the matter into which *species* can be incorporated and express their intelligibility. The intellect is no longer separate from the natural world in any essential way, and is thus better able to access and know it. While the agent intellect becomes a part of God, the possible intellect, at least as far as perception is involved, becomes a part of nature. Spruit's barrier between senses and intellect has been removed.